

* 請按順序作答

一、 單選題(每題 2 分* 10 題= 20 分)

1. Which statement is an accurate interpretation of the outcome in an ecosystem when a major predator is removed?
 - A. the remaining community adjusts and quickly becomes stable
 - B. the diversity of the ecosystem actually increases
 - C. the diversity of the ecosystem decreases since there is an increase in competition
 - D. the diversity of the ecosystem decreases because parasites become more of a problem
 - E. the diversity of the ecosystem decreases because new herbivores move in

2. If global warming continues at its present rate, which biomes will likely take the place of the coniferous forest (taiga)?
 - A. tundra and polar ice
 - B. temperate broadleaf forest and grassland
 - C. desert and chaparral
 - D. tropical forest and savanna
 - E. chaparral and temperate broadleaf forest

3. According to the non-equilibrium model,
 - A. Communities will remain in a state of equilibrium in the absence of human activities.
 - B. Communities structure remains constant in the absence of interspecific competition.
 - C. Communities are assemblages of closely linked species that function as tightly integrated units
 - D. Interspecific interactions induce changes in community composition over time
 - E. Communities are constantly changing because of disturbances.

4. When an organism becomes acclimated to a new environmental situation; it will generally involve
 - A. physiological changes.
 - B. genetic changes.
 - C. sociological changes.
 - D. both physiological changes and genetic changes.
 - E. both genetic changes and sociological changes.

5. You are most likely to observe primary succession when you visit a(n)
 - A. Tropical rain forest.
 - B. Abandoned field
 - C. Old riverbed
 - D. Fairly recent volcanic island
 - E. Deep sea vent

6. If you study two closely related predatory insect species, the two-spot and the three-spot avenger beetles, you notice that each species seeks prey at dawn in areas without the other species. Where their ranges overlap, however, the two-spot avenger beetles hunts at night and the three-spot hunts in the morning. When you bring them into the laboratory, their offspring behave in the same manner. You have discovered an example of
 - A. mutualism
 - B. character displacement
 - C. Batesian mimicry
 - D. commensalism
 - E. competitive exclusion

見背面

7. The difference in the fundamental niche and the realized niche is
 - A. the fundamental niche is the actual niche that a species occupies while the realized niche is not
 - B. the fundamental niche is the entire niche that a species is capable of using while the realized niche is just what is being occupied
 - C. the fundamental niche is smaller than the realized niche
 - D. the realized niche is theoretical while the fundamental niche is the entire niche that an organism can use
8. If the Sun were to suddenly stop providing energy to Earth, most ecosystems would vanish. Which of the following ecosystems would likely survive the longest after this hypothetical disaster?

A. tropical rainforest	B. tundra	C. benthic ocean
D. grassland	E. desert	
9. The carbon cycle is based on carbon dioxide. CO₂ makes up about

A. 30% of the atmosphere	B. 3% of the atmosphere	C. 0.3% of the atmosphere
D. 0.03% of the atmosphere	E. 0.003% of the atmosphere	
10. Which of the following factors is **not** one that increases the likelihood of population extinction?
 - A. Small population size is a factor contributing to a population's extinction.
 - B. Isolation of a population from sources of immigrants is a factor contributing to a population's extinction.
 - C. Isolation of a population from sinks of immigrants is a factor contributing to a population's extinction.
 - D. Low resource availability is a factor contributing to a population's extinction.
 - E. Lack of genetic diversity is a factor contributing to a population's extinction.

二、簡答題 (共30 分)

1. Scientists study ecology using the methods of science. What is "Ecology" and what are the "scientific methods"? (10 points)
2. What is **evolution**? What is the mechanism for biological evolution? (6 points)
3. Although there are 270,000 species of land plants, a series of filters eliminates most of these species from any given site and restricts that actual vegetation to a relatively small number of species. What could be the possible restraints that determine the species composition of vegetation in a particular area? (9 points).
4. Why we said that worldwide agriculture could successfully feed more people, if human eat only plant materials? (5 points)

三、解釋下列名詞(共 20 分) Explain the following terms (each 5 points):

- (a) Trophic cascade
- (b) Ecosystem services
- (c) Biodiversity hotspots
- (d) The theory of island biogeography

四、問答題 (共 30 分)

1. Describe at least 4 hypotheses that have been proposed to explain the latitudinal gradient of species richness. (16 points)
2. Describe the 3 mechanisms of succession that Connell and Slayter proposed. (14 points)